



SECOR  
INTERNATIONAL  
INCORPORATED

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Rancho Cordova, CA 95670  
916-861-0400 TEL  
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February 14, 2006

Mr. Ronald Allen  
California Regional Water Quality Control Board  
North Coast Region  
5550 Skyline Blvd., Suite A  
Santa Rosa, CA 95403

**Re: Ozone Well Installation Report**  
Unocal Bulk Plant # 0140  
255 State Highway 101, South  
Crescent City, California  
SECOR Project No.: 77CP.60925.03.0010

Mr. Ronald Allen:

This letter, prepared by SECOR International Incorporated (SECOR) on behalf of ConocoPhillips, presents the results of ozone injection well installation activities and the status of remedial system installation and startup for the site referenced above (Figure 1). This work was performed with the approval of the California Regional Water Quality Control Board – North Coast Region (CRWQCB-NCR), as stated in correspondence dated April 21, 2005 (Attachment 1). A description of the site background, previous investigations, completed scope of work, findings, conclusions, and a description of the ozone injection installation are presented below.

### **SITE BACKGROUND**

The site historically operated as a bulk terminal for the storage and distribution of petroleum products including gasoline, diesel, and motor oil. Four aboveground storage tanks (ASTs) and two underground storage tanks (USTs) were used at the site (Figure 2).

Work at the site has included removal of two USTs, replacement of four ASTs, soil boring and groundwater investigations, removal and disposal of approximately 740 cubic yards of petroleum hydrocarbon impacted soil (RESNA, 1994), and the installation of seven monitoring wells.

### **PREVIOUS INVESTIGATIONS AND REMEDIAL ACTION**

The former Unocal Bulk Plant #0140 in Crescent City, California historically operated as a bulk plant for the storage and distribution of petroleum products including gasoline, diesel, and motor oil. Four ASTs and two underground spill containment tanks were used at the site.

On July 13, 1990, Applied GeoSystems supervised the removal of two 550-gallon "stop" tanks. Soil and groundwater samples were collected from the tank cavities (Applied GeoSystems, November 1990).

In July of 1990, Applied GeoSystems advanced 22 soil borings (B-1 through B-22) at the site. Soil samples were collected from several of the borings. Petroleum hydrocarbons were detected in soil from several samples (Applied GeoSystems, December 1990).

In August of 1990, Applied GeoSystems oversaw the excavation and disposal of approximately 740 cubic yards of soil (Applied GeoSystems, December 1990).

In March of 1991, six soil borings (B-23 through B-28) were installed and converted to groundwater monitoring wells (MW-1 through MW-6) (RESNA, 1991).

In June of 1994, RESNA conducted an environmental investigation to further evaluate soil and groundwater conditions in the vicinity of the plant. Five soil borings (B-29 through B-33) were advanced during the investigation (RESNA, 1994).

Results from both the site investigations and quarterly groundwater monitoring reports indicated that soil and groundwater contamination existed at the boundaries of the property and (potentially) off site, toward the west.

On May 19, 2000, SHN supervised the installation of monitoring well MW-7 on the Elk Creek Wildlife Refuge property located west of the bulk plant (SHN, 2000).

In March 2001, SHN supervised the installation of seven soil borings (B-101 through B-107) and one monitoring well (MW-8) (SHN, 2001).

In May 2001, a tidal study was conducted at the site (SHN, October 2001). Based on the data collected, the tide has a very minimal influence on groundwater at the site.

On December 9 and 10, 2002, SHN supervised the installation of eight Membrane Interface Probe (MIP) borings and seven direct push borings with temporary well points (SHN, February 2003). The objective of the investigation was to assess soil and groundwater conditions in the vicinity of the Oil/Water Separator (OWS). MIP borings indicated significant concentrations of petroleum hydrocarbons were present only in the immediate vicinity of MIP boring #1. Petroleum-impacted soil and groundwater were detected in samples from the areas near the OWS and the former UST. One groundwater sample was collected from approximately 20 feet below ground surface (bgs) to define the vertical extent of groundwater contamination (B-207). No constituents were detected in the groundwater sample collected from B-207.

On October 13 to 16, 2003, SHN supervised Northcoast Environmental Construction (NEC) in the removal of the existing OWS and excavation of petroleum impacted soils around the OWS (SHN, November 2003). Soil samples were collected from the sidewalls and floor of the excavation pit. Approximately 66.5 tons of soil (approximately 72 cubic yards) were removed from the site.

Before the excavation was backfilled, approximately 500 pounds of Oxygen Releasing Compound (ORC®) were placed into the excavation cavity. The ORC® was mixed with potable water in the backhoe bucket and placed into the excavation cavity. After the ORC placement, the excavation cavity was lined with geofabric and bioventing piping was

installed. Class II drain rock was placed on the geofabric, and the OWS and biovent piping were installed. Class II drain rock was used to fill the excavation cavity to a depth of approximately 3 feet bgs. The geofabric was used to line the top of the drain rock, and the remainder of the excavation cavity was filled with native material and compacted. The area around the OWS was completed with aggregate base material, and the remainder was graded, seeded, and covered with straw.

### SCOPE OF WORK

The scope of work included the installation of eight ozone sparge wells for an ozone sparge system at the locations shown on Figure 2. Drilling activities were performed by Cascade Drilling Inc. of Rancho Cordova, California. The completed scope of work is discussed below:

- **Health and Safety Plan.** As required by the Occupational Health and Safety Administration (OSHA) Standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR 1910.120), and by California Occupational Health and Safety Administration (Cal-OSHA) "Hazardous Waste Operations and Emergency Response" guidelines (CCR Title 8, Section 5192), SECOR prepared a site-specific Health and Safety Plan (HASP). Field staff and contractors reviewed the HASP before beginning field operations at the site.
- **Permits.** Prior to the commencement of the drilling activities, SECOR obtained monitoring well/boring installation permits from the County of Del Norte Department of Health and Social Service (CDNDHSS). A copy of the permits is included in Attachment 2.
- **Remedial Well Installation.** From November 1 through November 22, 2005, SECOR field staff supervised Cascade Drilling, Inc. during the installation of eight ozone wells (OZ-1 through OZ-4 and OZ-6 through OZ-9). Each of the ozone sparge wells were constructed with ¾ inch diameter schedule 80 polyvinyl chloride (PVC) blank casing extending from just below the ground surface to the microsparge defuser tip. The microsparge defuser tips measure 2.5 inches wide by 2.5 feet long. All work was conducted in accordance with stipulations within well construction permits obtained from the CDNDHSS (Attachment 2). Field and laboratory procedures are presented in Attachment 4. Boring logs and well construction details are included in Attachment 5.
- **Soil Sampling.** Soil samples were collected for lithological description at 5-foot intervals from selected borings. The soil was then logged and field screened for the presence of volatile organic compounds (VOCs) with a PID.
- **Remediation System Installation.** Remediation system construction is scheduled during the week of February 27, 2006. Construction will begin once SECOR obtains the necessary permits.
- **System Start-up and Shake Down.** SECOR technicians will conduct a system start-up and shake down procedure once the system is installed to ensure system

functionality. Additionally, all fail safe mechanisms and interlocks will be tested to ensure the system is capable of automatic shutdown during alarm conditions.

- **Monthly Operation and Maintenance.** An operation and maintenance (O&M) manual will be prepared as a stand alone document to assist personnel during the operation and performing compliance monitoring of the remediation system. The system manual will include as-built drawings, monitoring and maintenance checklists and schedules, troubleshooting guides, and equipment operating manuals. SECOR will visit the site once per month to monitor and adjust the ozone sparging well configurations.
- **Groundwater Sampling.** Groundwater samples from select monitoring wells (MW-2, MW-5, MW-6, and MW-7) will be sampled for the following constituents; bromide, bromate, hexavalent chromium, vanadium, selenium, molybdenum, arsenic, and selenium during a quarterly monitoring event prior to the ozone system start-up, and during the ozone system operation. Groundwater samples collected from the select monitoring wells will also be analyzed for dissolved iron, nitrate, sulfate, and alkalinity prior to the system start up and during subsequent quarterly monitoring events. All other constituents will be analyzed during the normal quarterly monitoring reporting program.
- **Quarterly Reporting.** Remedial summaries that include a summary of system operation, monitoring and sampling results, field notes, copies of the analytical lab results, and tables summarizing the field and analytical data will be submitted quarterly with the Quarterly Monitoring and Summary Report.
- **Soil Cuttings and Purge Water.** During well installation on November 1 through November 22, 2005, 19 drums of soil cuttings and 3 drums of rinsate water were generated. These drums were temporarily stored on-site in State of California, Department of Transportation (DOT)-approved, 55-gallon, steel drums. Filter Recycling Services, Inc. (FRS), a California-certified disposal contractor, removed the drummed soil cuttings and rinsate water on December 6, 2005 and transported it to their facility for treatment/disposal (Attachment 3).

## CONCLUSIONS

### Subsurface Conditions

On-site soils encountered were predominately sands extending from ground surface to well termination depth (approximately 16 feet bgs). Stabilized shallow groundwater was measured in existing on-site monitoring wells at approximately 5 feet below top of casing.

## CONCLUSIONS AND RECOMENDATIONS

### Recommendation

Once the ozone system is on-line, monthly monitoring of the system will be performed and groundwater samples will be collected to evaluate the effectiveness of the system and to make any adjustments if warranted.

### LIMITATIONS

This report has been prepared for the exclusive use of ConocoPhillips and its representatives as it pertains to the property located at 255 Highway 101, South, Crescent City, California. The evaluation of subsurface conditions at the site for the purpose of this investigation is inherently limited due to the number of points of investigation. There are no representations, warranties, or guarantees that the results are representative of the entire site. Data from this report reflects the conditions at locations at a specified time. No other interpretation, representations, warranties, guarantees, express or implied, are included or intended in the report findings.

If there are any questions, please call us at (916) 861-0400.

Sincerely,  
SECOR International, Incorporated

*Devon Hovis*

Devon Hovis  
Staff Scientist

*Thomas M. Potter*

Thomas M. Potter  
Project Manager

*D. Schreiner*

Dan Schreiner, P.G.  
Associate Geologist



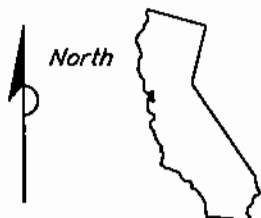
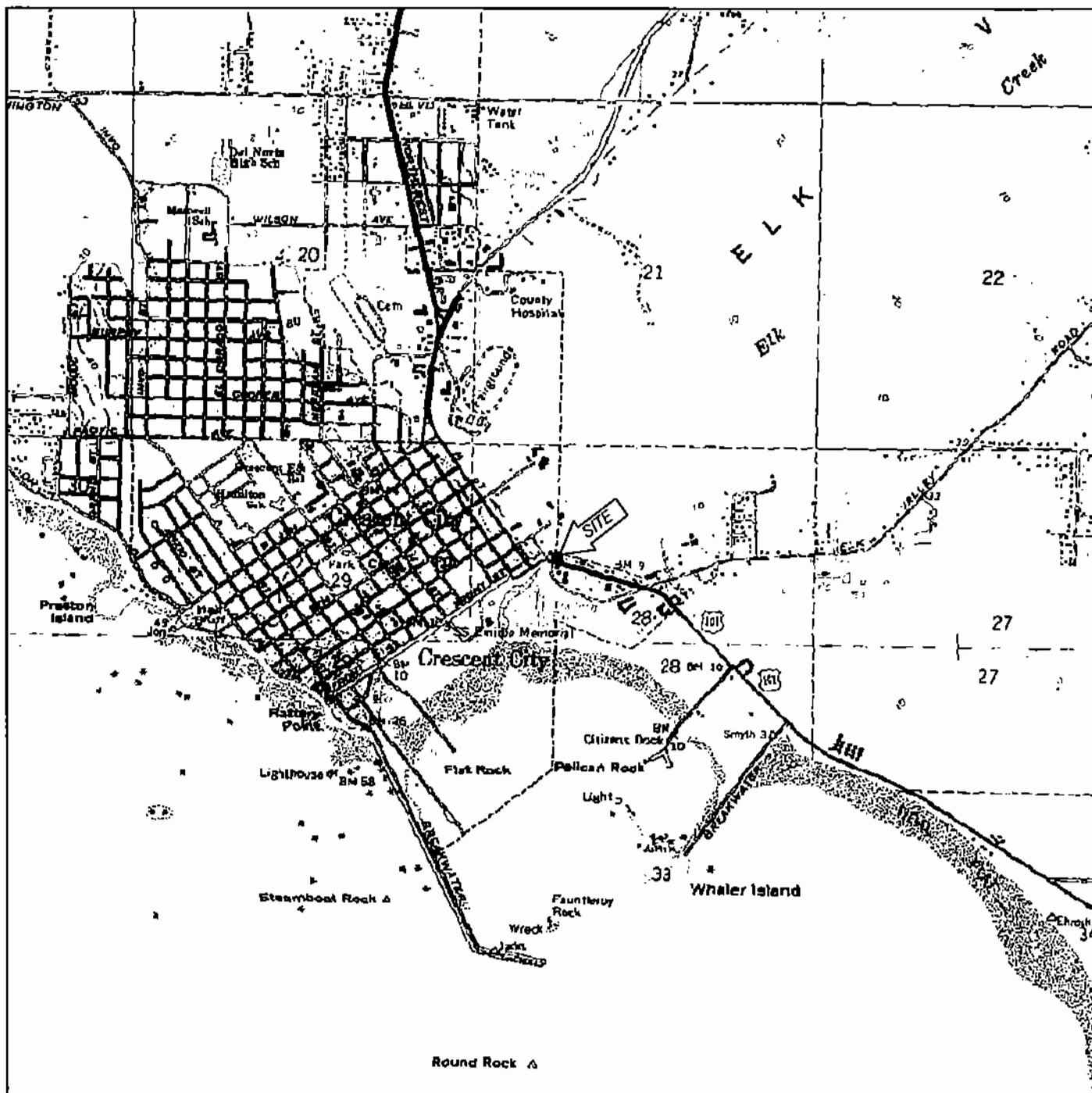
Attachments: Figure 1 – Site Location Map  
Figure 2 – Site Plan

Table 1 – Well Construction Details

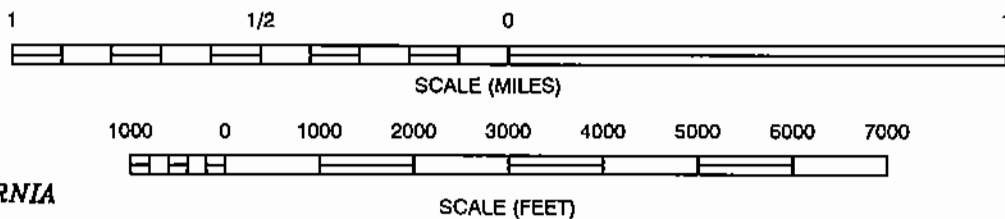
Attachment 1 – CRWQCB Approval Letter Dated September 7, 2005  
Attachment 2 – County of Del Norte Department of Health and  
Social Services Permits  
Attachment 3 – Hazardous Waste Manifest Documentation  
Attachment 4 – Field and Laboratory Procedures  
Attachment 5 – Boring Logs and Well Construction Details

cc: Mr. Thomas Kosel, ConocoPhillips  
Mr. Chris Renner, Renner Petroleum  
Mr. Donald Kelly, California Department of Fish & Game  
Mr. Leon Perrault, Del Norte County Department of Environmental Health  
Mr. Ian Robb, Cambria Environmental Technology, Inc.

FIGURES



CALIFORNIA



REFERENCE: USGS 7.5 MINUTE QUADRANGLE, CRESCENT CITY, CALIFORNIA



**SECOR**

3017 KILGORE ROAD, SUITE 100  
RANCHO CORDOVA, CALIFORNIA  
PHONE: (916) 861-0400/981-0430 (FAX)

FOR:

UNOCAL BULK PLANT #0140  
255 HIGHWAY 101, SOUTH  
CRESCENT CITY, CALIFORNIA

## SITE LOCATION MAP

FIGURE:

**1**

JOB NUMBER:

77CP.60925.03.0010

DRAWN BY:

DWR

CHECKED BY:

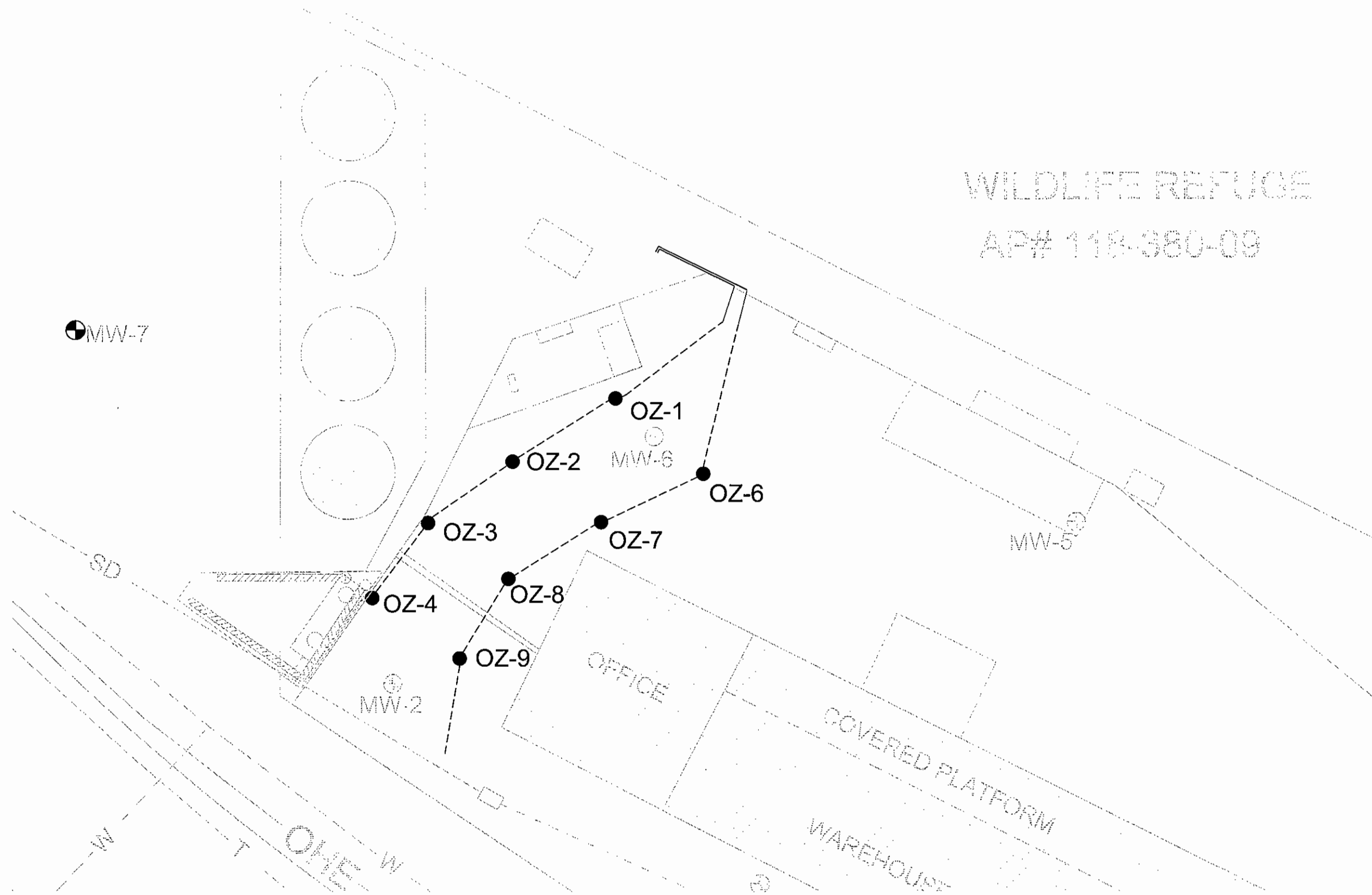
DH

APPROVED BY:

RB

DATE:

12/07/05



- LEGEND:**
- GROUNDWATER MONITORING WELL
  - OZ-1 OZONE SPARGE WELL
  - W** APPROXIMATE WATER MAIN LINE
  - T** APPROXIMATE TELEPHONE LINE
  - SD** APPROXIMATE 24" STORM DRAIN
  - OHE** APPROXIMATE OVERHEAD ELECTRICAL LINE

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<p>3017 KILGORE ROAD, SUITE 100 RANCHO CORDOVA, CALIFORNIA PHONE: (916) 861-0400/861-0430 (FAX)</p>	FOR: UNOCAL BULK PLANT #0140 255 HIGHWAY 101, SOUTH CRESCENT CITY, CALIFORNIA		SITE PLAN		FIGURE: <b>2</b>
	JOB NUMBER: 77CP.60925.03.0010	DRAWN BY: DWR	CHECKED BY: DH	APPROVED BY: TP	DATE: 12/07/05



TABLES

**Table 1**  
**Soil Boring and Well Construction Details**

ConocoPhillips Bulk Plant #0140  
255 Highway 101, South  
Crescent City, California

Well I.D.	Drill Date	Date Installed	Well		Sparge Tip		Filter Pack Top (bgs)	Filter Pack Bottom (bgs)	Ben- tonite Top (bgs)	Ben- tonite Bottom (bgs)
			Depth (bgs)	Diameter (inches)	Top (bgs)	Bottom (bgs)				
OZ-1	11/2/2005	11/02/05	16.5	0.25	14	16.5	13.5	16.5	11.5	13.5
OZ-2	11/2/2005	11/02/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-3	11/2/2005	11/02/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-4	11/22/2005	11/22/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-5	11/22/2005	11/22/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-6	11/2/2005	11/02/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-7	11/22/2005	11/22/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-8	11/22/2005	11/22/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
OZ-9	11/22/2005	11/22/05	16	0.25	13.5	16.0	13.0	16.0	11.0	13.0
<b>Explanations:</b>										
bgs = Below ground surface.										

**ATTACHMENT 1**  
**CRWQCB APPROVAL LETTER DATED SEPTEMBER 7, 2005**  
Ozone Injection Well Installation  
ConocoPhillips Bulk Plant #0140  
255 Highway 101, South  
Crescent City, California



Alan C. Lloyd, Ph.D.  
Agency Secretary

**California Regional Water Quality Control Board**  
**North Coast Region**  
**Beverly Wasson, Chairperson**

<http://www.waterboards.ca.gov/northcoast>  
5550 Skylark Boulevard, Suite A, Santa Rosa, California 95403  
Phone: 1 (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135



Arnold  
Schwarzenegger  
Governor

September 7, 2005

Marty Cramer  
Phillips Petroleum Company  
5528 NW Doane Avenue  
Portland OR 97210

Chris Renner  
255 Highway 101, South  
Crescent City, CA 95531

Dear Mr. Cramer and Mr. Renner:

Subject: Approved Corrective Action Plan and Monitoring & Reporting Program  
R1-2005-0092

File: Unocal Bulk Plant # 0140, 255 Highway 101, Crescent City, California;  
Case Number 1TDN019

In a December 2004 telephone conversation with Mr. Roland Reuber (SHN Consulting Engineers & Geologists, Eureka, California) I notified him that the 30-day public comment period for the Corrective Action Plan had ended and no comments were received by this office. The ozone sparging remediation process was approved for implementation. Mr. Reuber told me that the process would be installed sometime in the third or fourth quarter of 2005. I informed him that a monitoring and reporting program for the proposed ozone sparging at the site was in development.

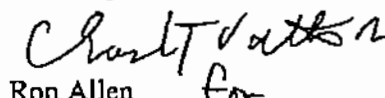
Enclosed is Monitoring and Reporting Program R1-2005-0092 for the site.

Please provide a ten day advance notice to this office prior to the start of field operations.

At the completion of fieldwork please submit a report of your findings to this office no later than November 30, 2005.

If you have any questions concerning this matter, please contact me at (707) 574-2848 or via email: [Rallen@waterboards.ca.gov](mailto:Rallen@waterboards.ca.gov).

Sincerely,

  
Ron Allen  
Environmental Scientist

RRA:rob/090705\_rra\_Unocal0140\_Ozone\_MandR\_Program.doc

California Environmental Protection Agency

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SEP 09 2005

BY:.....

Enclosure: Monitoring and Reporting Program R1-2005-0092 3

cc: Leon Perreault, Del Norte County Health Department, 880 Northcrest Drive,  
Crescent City, CA 95531

Daniel Beck, California Department of Fish and Game, 619 Second Street,  
Eureka, CA 95501

Mike Foget, SHN Consulting Engineers & Geologists, 812 W. Wabash Avenue,  
Eureka, CA 95501

Mr. Tom Potter, SECOR International Incorporated, 3017 Kilgore Road, Suite 100,  
Rancho Cordova, CA 95670

California Regional Water Quality Control Board  
North Coast Region

MONITORING AND REPORTING PROGRAM NO. R1-2005-0092

FOR

UNOCAL BULK PLANT #0140  
255 HIGHWAY 101  
CRESCENT CITY, CALIFORNIA

Del Norte County

**MONITORING**

1. Prior to purging, the depth to groundwater shall be determined to at least 0.01 foot increments in all groundwater monitoring wells quarterly. The data generated from the elevation readings must be referenced to mean sea level.
2. The water samples collected from monitoring wells MW-1 through MW-8 shall be analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg) Total Petroleum Hydrocarbons as diesel (TPHd), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), and Methyl tertiary-Butyl Ether (MtBE).
3. Groundwater samples from the monitoring wells used to monitor the ozone remediation system (monitoring wells MW-2, MW-5, MW-6 and MW-7) shall also be collected prior to the beginning of ozone injection, one month after ozone injection begins, and quarterly thereafter for analysis for the following parameters: dissolved oxygen; Oxidation/Reduction Potential (ORP); temperature; pH; bromide; bromate; dissolved hexavalent chromium; dissolved vanadium; dissolved selenium; and dissolved molybdenum. The dissolved oxygen, ORP, temperature, and pH shall be measured in the field. The laboratory reporting limit for hexavalent chromium should be no higher than 5 µg/l and the laboratory reporting limit for bromate should be no higher than 10 µg/l.
4. All laboratory analyses shall be performed at a laboratory certified by the California Department of Health Services.

**REPORTING**

5. Quarterly monitoring reports shall be submitted to this office in accordance with the following schedule:

<u>Reporting Period</u>	<u>Due Date</u>
January, February, March	May 1
April, May, June	August 1
July, August, September	November 1
October, November, December	February 1

6. A groundwater elevation contour map shall be included for each set of measurements and shall include the following:
  - location of the facilities;
  - location of the monitoring wells;
  - location of the former underground tanks; and
  - groundwater flow pattern including the direction of the groundwater gradient.
7. A contamination isogram map shall be included for each significant pollutant detected during the monitoring events and shall include the following:
  - location of the facilities;
  - location of the monitoring wells; and
  - location of the former underground tanks.
8. Current and previous analytical results shall be reported in tables which include the following:
  - sampling point;
  - date of sample collection;
  - constituents and analytical results; and
  - quantification limits employed for non-detect analytical results.
9. Current and previous remedial system operation and maintenance activities shall be reported in the monitoring reports.
10. Each report shall contain copies of the well purging and sampling field logs; chain of custody documents showing the time and date of collection and person collecting; and signed laboratory sheets including quality control data and explanations of analytical anomalies, if any. These supporting documents may be included as appendices to the report.
11. Monitoring data shall also be submitted electronically to the State Water Resources Control Board's GeoTracker database.

Ordered by



Catherine Kuhlman  
Executive Officer

September 7, 2005

**ATTACHMENT 2**  
**COUNTY OF DEL NORTE DEPARTMENT OF HEALTH AND**  
**SOCIAL SERVICES PERMITS**

Ozone Injection Well Installation  
ConocoPhillips Bulk Plant #0140  
255 Highway 101, South  
Crescent City, California





# COUNTY OF DEL NORTE

## DEPARTMENT OF HEALTH AND SOCIAL SERVICES

880 Northcrest Dr.  
Crescent City, CA 95531  
(707) 464 3191 Fax (707) 465-1783

RECEIVED  
Del Norte County

OCT 21 2005

Gary R. Blatnick, Director/ Public Guardian  
Thomas Martinelli, M.D., Health Officer

### APPLICATION FOR WATER WELL PERMIT

FEE: \$155.00

**PAID**

CK. NO. 636391 @ 155.00  
DATE 10/21/05 Rec'd # 225 255  
(21)

Applicant: CONOCO PHILLIPS  
Mailing Address:  
76 BROADWAY  
SACRAMENTO, CA 95818  
City State Zip  
Telephone: 916-558-7666

Well Contractor: CASCADE DRILLING, Inc.  
License Number: C 57-717510  
Mailing Address:  
3632 OMEGA CIRCLE  
RANCHO CORDOVA, CA 95742  
City State Zip  
Estimated cost of work: \$45,000

Property Owner: CHRIS RENNER  
Mailing Address:  
255 HIGHWAY 101 SOUTH  
CRESCENT CITY, CA 95531  
City State Zip  
Property Location:  
Street or Road Name 255 HIGHWAY 101  
Assessor's Parcel# 118-038-001  
Parcel Map# 038 Lot# 001  
Subdivision# \_\_\_\_\_ Lot# \_\_\_\_\_  
Property Dimension:

Type of Work:  
New Well ☒ Deepening \_\_\_\_\_  
Destroying \_\_\_\_\_ Reconditioning \_\_\_\_\_  
Proposed Use:  
Domestic \_\_\_\_\_ Public \_\_\_\_\_  
Industrial \_\_\_\_\_ Agricultural \_\_\_\_\_  
Monitoring (attach cross section schematic) \_\_\_\_\_  
Other OZONE INJECTION WELLS

Equipment:  
Cable \_\_\_\_\_ Air Perc. Rotary \_\_\_\_\_  
Rotary \_\_\_\_\_ Other HOLLOW STEM AUGER

Casing:  
Name of Supplier \_\_\_\_\_  
Steel \_\_\_\_\_ Plastic ☒ Other CERAMIC DIFFUSER TIPS  
Diameter \_\_\_\_\_ Wall Thickness \_\_\_\_\_

Proposed:  
Depth & Diameter inner casing 2.5' DIFFUSER 3/4" CASING  
Depth & Diameter annular space 13' to 17'  
Proposed depth of well 16' to 20'

Length: 195 ft. Width: 100 ft.  
Acreage: \_\_\_\_\_

Thomas Martinelli 10/10/05  
Signature Date

### DO NOT WRITE BELOW THIS LINE

PERMISSION IS HEREBY GRANTED TO Conoco Phillips for the above well work in accordance with all State and County laws and standards as provided in 94-13, and any conditions as set forth in this permit.

GRANTED BY: Len A. Penner with the following and attached conditions:

1. Well to be located as required in California water well standards and a minimum of 100 feet from any sewer or septic tank, and a minimum of 100 feet from any structure or facility designed to allow sewage to percolate into the ground.
2. Call the Health Department at least four (4) hours prior to placing final seal.
3. Well completion reports to be submitted prior to final approval.
4. Other Conditions: \_\_\_\_\_

Final seal inspection by \_\_\_\_\_  
Signature and Date

Effective Date 10/24/05

Final approval by \_\_\_\_\_  
Signature and Date

Expiration Date 10/24/06

NOTE: ATTACH PLOT PLAN

**ATTACHMENT 3**  
**HAZARDOUS WASTE MANIFEST DOCUMENTATION**  
Ozone Injection Well Installation  
ConocoPhillips Bulk Plant #0140  
255 Highway 101, South  
Crescent City, California



## FILTER RECYCLING

S. E. A. V. E. S. N. O.

P.O. Box 449  
Colton, CA 92324-0449  
1-800-698-4377

## "PRESERVING OUR NATURAL RESOURCES

Date: 12-06-05		Invoice Number: 07101	
Customer Number:			
Customer Name: UNOCAL BULK PLANT 140		Phone #: 916-861-0400	
Bill To: SECOR INTERNATIONAL		Phone #: 916-861-0400	
Site Address: 255 HWY 101 SOUTHERN		Billing Address: ATTN: NEZ SCOTT	
City, State, Zip Code: CRESENT CITY, CA 95531		City, State, Zip Code:	
Sales Rep. JB	Site Contact	C.O.D.	On Account XX
Purchase Order #		Billing Contact	Requested By
A-P		D. HARRIS	
Quantity	Material Description	Manifest Number	Unit Price
	REQ'D BY DENON HARRIS		
19	P/U 19 X 55 NON HAZ SOIL	1107101	
2	P/U 2 X 55 NON HAZ WATER	4 12	
DRIVER: DRUMS ARE STORED IN BACK OF THE OFFICE BUILDING LOCATED AGAINST THE PIPES, NEAR THE ABOVE GROUND STORAGE TANKS			
5% ENERGY SURCHARGE APPLIES			
Facility Name: Filter Recycling Services, Inc.		Time Left Plant: 8:30	
Address: 180 West Monte Avenue - Rialto, CA 92316		Job Start Time: 10:00	
EPA ID Number: CA098244481		Job End Time: 11:00	
Drivers Signature: [Signature]		Plant Return Time:	
It is Generator's responsibility to correctly identify chemical composition. If material is rejected by disposal site, generator agrees to pay all testing & transportation charges. Invoice is subject to a 1.5% monthly interest rate, with net 30 day terms from date of service.			
Received By: [Signature]		Print Name: THERESE BETTEN COURT	
Subtotal		Sales Tax	
Total			

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of 1	11/30/2005
3. Generator's Name and Mailing Address CONOCO PHILLIPS ATTN: RITA COTTON 600 N DAIRY ASHFORD, TRULOCK HOUSTON, TX 77079					
4. Generator's Phone (281) 293-6647					
5. Transporter 1 Company Name FILTER RECYCLING SVS, INC. NO	6. US EPA ID Number E A 2 0 0 1 2 8 3 0 4	A. Transporter's Phone (510) 670 9901			
7. Transporter 2 Company Name FILTER RECYCLING SERVICES, INC.	8. US EPA ID Number E A D 9 8 2 4 4 4 4 8 1	B. Transporter's Phone (909) 873-4141			
9. Designated Facility Name and Site Address FILTER RECYCLING SERVICES, INC 180 W MONTE AVE RIALTO, CA 92316	10. US EPA ID Number E A D 9 8 2 4 4 4 4 8 1	C. Facility's Phone (909) 421-2611			
11. Waste Shipping Name and Description		12. Containers No.	Type	13. Total Quantity	14. Unit (Wt/Vol)
a. NON HAZARDOUS WASTE LIQUID		002		00.110	G
b. NON HAZARDOUS WASTE SOLID		019	DM	14.725	E
c.					
d.					
D. Additional Descriptions for Materials Listed Above 1A) WATER 1B) SOIL		E. Handling Codes for Wastes Listed Above			
15. Special Handling Instructions and Additional Information Wear appropriate protective clothing P/S: UNCAL BULK PLANT 140 255 HWY 101 SOUTH 24 Hour Emergency Response # (909) 721-2038 CRESENT CITY, CA 95531					
16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.					
Printed/Typed Name THERESE BETTEN/COURT		Signature Theresa Bettencourt		Month Day Year 12/20/05	
17. Transporter 1 Acknowledgement of Receipt of Materials Printed/Typed Name DAN SIMMONS		Signature D. Simmons		Month Day Year 12/20/05	
18. Transporter 2 Acknowledgement of Receipt of Materials Printed/Typed Name		Signature		Month Day Year	
19. Discrepancy Indication Space					
20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in item 19.					
Printed/Typed Name		Signature		Month Day Year	

ORIGINAL - RETURN TO GENERATOR

**ATTACHMENT 4**  
**FIELD AND LABORATORY PROCEDURES**  
Ozone Injection Well Installation  
ConocoPhillips Bulk Plant #0140  
255 Highway 101, South  
Crescent City, California

## ATTACHMENT 4

### FIELD AND LABORATORY PROCEDURES

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#### **Exploratory Drilling**

The soil borings for wells OZ-1 through OZ-9 were drilled using 8-inch hollow-stem auger drilling equipment. Each boring was logged by a SECOR geologist, under the direction of a SECOR California Professional Geologist, using the Unified Soil Classification System and standard geologic techniques. Soil samples for logging were collected at 5-foot depth intervals using a California-modified split-spoon sampler. The sampler was driven a maximum of 18 inches using a 140-pound hammer with a 30-inch drop. All down-hole drilling and sampling equipment was steam-cleaned prior to and following the completion of the soil borings. Down-hole sampling equipment was washed in a trisodium phosphate oralconox solution between samples.


#### **Remedial Well Installation**

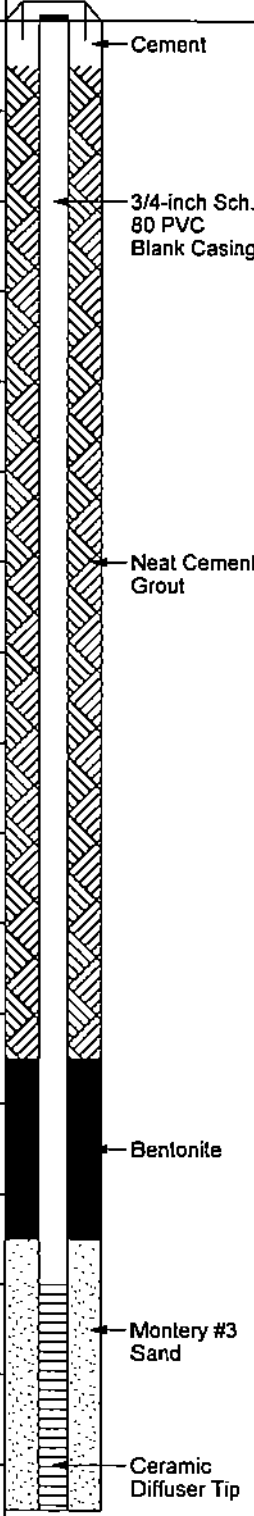
Each ozone injection well was completed within the soil boring by installing a 3/4-inch diameter, flush-threaded, Schedule 80 PVC casing with a 2.5 foot ceramic sparge diffuser. A Monterey No. 3 sand pack was placed in the annular space across the entire screened interval, extending approximately 0.5 feet above the top of the diffuser. A 2-foot bentonite transition seal was placed atop the sand pack followed by a neat cement seal, extending from the top of the bentonite transition seal (approximately 11 feet below ground surface) to just below the ground surface.

#### **Soil Cuttings and Purge Water**

Soil generated during the installation of wells OZ-1 through OZ-9, water generated during steam cleaning equipment, and purge water generated during well development was temporarily stored in 22 State of California, Department of Transportation-approved 55-gallon steel drums. Filter Recycling Services, Inc., a California certified disposal contractor, removed the drummed soil cuttings and rinsate water on December 6, 2005 and transported the soil cuttings and water to their facility for treatment/disposal.

**ATTACHMENT 5**  
**BORING LOGS AND WELL CONSTRUCTION DETAILS**  
Ozone Injection Well Installation  
ConocoPhillips Bulk Plant #0140  
255 Highway 101, South  
Crescent City, California

PROJECT: <b>ConocoPhillips Bulk Plant #140</b> LOCATION: <b>255 Highway 101, South, Crescent City, California</b> PROJECT NUMBER: <b>77CP.60925.03.0010</b>		WELL / PROBEHOLE / BOREHOLE NO: <div style="text-align: center; font-size: 1.5em; font-weight: bold;">OZ-1</div> PAGE 1 OF 1		 <b>SECOR</b>
DRILLING: STARTED <b>11/2/05</b> COMPLETED: <b>11/2/05</b> INSTALLATION: STARTED <b>11/2/05</b> COMPLETED: <b>11/2/05</b> DRILLING COMPANY: <b>Cascade</b> DRILLING EQUIPMENT: <b>Limited Access Rig</b> DRILLING METHOD: <b>Hollow Stem Auger</b> SAMPLING EQUIPMENT: <b>California Split Spoon</b>		NORTHING (ft): LATITUDE: GROUND ELEV (ft): INITIAL DTW (ft): <b>NE</b> STATIC DTW (ft): <b>5 11/2/05</b> WELL CASING DIAMETER (in): <b>3/4</b> LOGGED BY: <b>D. Hovis</b>		EASTING (ft): LONGITUDE: TOC ELEV (ft): BOREHOLE DEPTH (ft): <b>16.5</b> WELL DEPTH (ft): <b>16.5</b> BOREHOLE DIAMETER (in): <b>8</b> CHECKED BY: <b>T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							
5		SP	SAND ; SP; dark brown; fine to medium-grained; soft; saturated; no odor; no staining; moderate cementation; subrounded; poorly graded						5	
10									10	
15			Slight odor						15	
			Hole terminated at 16.5 feet.							



PROJECT: <b>ConocoPhillips Bulk Plant #140</b>		WELL / PROBEHOLE / BOREHOLE NO:	
LOCATION: <b>255 Highway 101, South, Crescent City, California</b>		<b>OZ-2</b> PAGE 1 OF 1	
PROJECT NUMBER: <b>77CP.60925.03.0010</b>		SECOR	
DRILLING: STARTED <b>11/2/05</b>	COMPLETED: <b>11/2/05</b>	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED <b>11/2/05</b>	COMPLETED: <b>11/2/05</b>	LATITUDE:	LONGITUDE:
DRILLING COMPANY: <b>Cascade</b>		GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: <b>Limited Access Rig</b>		INITIAL DTW (ft): <b>NE</b>	BOREHOLE DEPTH (ft): <b>16.0</b>
DRILLING METHOD: <b>Hollow Stem Auger</b>		STATIC DTW (ft): <b>5 11/2/05</b>	WELL DEPTH (ft): <b>16.0</b>
SAMPLING EQUIPMENT: <b>California Split Spoon</b>		WELL CASING DIAMETER (in): <b>3/4</b>	BOREHOLE DIAMETER (in): <b>8</b>
		LOGGED BY: <b>D. Hovis</b>	CHECKED BY: <b>T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							Cement
5		SP	SAND ; SP; dark brown; fine to medium-grained; soft; saturated; no odor; no staining; moderate cementation; subrounded; poorly graded						5	3/4-inch Sch. 80 PVC Blank Casing
10									10	Neat Cement Grout
15			Slight odor						15	Bentonite
			Hole terminated at 16 feet.							Monterey #3 Sand
										Ceramic Diffuser Tip

<b>PROJECT: ConocoPhillips Bulk Plant #140</b> <b>LOCATION: 255 Highway 101, South, Crescent City, California</b> <b>PROJECT NUMBER: 77CP.60925.03.0010</b>		WELL / PROBEHOLE / BOREHOLE NO: <div style="font-size: 1.5em; font-weight: bold; display: inline-block;">OZ-3</div> PAGE 1 OF 1		
DRILLING:      STARTED <b>11/2/05</b> COMPLETED: <b>11/2/05</b> INSTALLATION: STARTED <b>11/2/05</b> COMPLETED: <b>11/2/05</b> DRILLING COMPANY: <b>Cascade</b> DRILLING EQUIPMENT: <b>Limited Access Rig</b> DRILLING METHOD: <b>Hollow Stem Auger</b> SAMPLING EQUIPMENT: <b>California Split Spoon</b>		NORTHING (ft): LATITUDE: GROUND ELEV (ft): INITIAL DTW (ft): <b>NE</b> STATIC DTW (ft): <b>5 11/2/05</b> WELL CASING DIAMETER (in): <b>3/4</b> LOGGED BY: <b>D. Hovis</b>		EASTING (ft): LONGITUDE: TOC ELEV (ft): BOREHOLE DEPTH (ft): <b>16.0</b> WELL DEPTH (ft): <b>16.0</b> BOREHOLE DIAMETER (in): <b>8</b> CHECKED BY: <b>T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							
5	SP		SAND ; SP; dark brown; fine to medium-grained; soft; saturated; no odor; no staining; moderate cementation; subrounded; poorly graded						5	
10									10	
15			Slight odor						15	
			Hole terminated at 16 feet.							

PROJECT: **ConocoPhillips Bulk Plant #140**  
 LOCATION: **255 Highway 101, South, Crescent City, California**  
 PROJECT NUMBER: **77CP.60925.03.0010**

WELL / PROBEHOLE / BOREHOLE NO:

**OZ-4** PAGE 1 OF 1




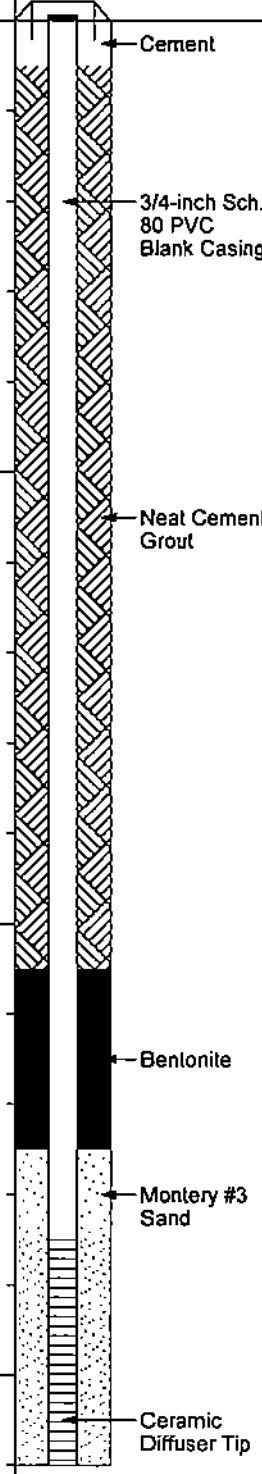
DRILLING: STARTED **11/22/05** COMPLETED: **11/22/05**  
 INSTALLATION: STARTED **11/22/05** COMPLETED: **11/22/05**  
 DRILLING COMPANY: **Cascade**  
 DRILLING EQUIPMENT: **Limited Access Rig**  
 DRILLING METHOD: **Hollow Stem Auger**  
 SAMPLING EQUIPMENT: **California Split Spoon**


NORTHING (ft):  
 LATITUDE:  
 GROUND ELEV (ft):  
 INITIAL DTW (ft): **NE**  
 STATIC DTW (ft): **5 11/22/05**  
 WELL CASING DIAMETER (in): **3/4**  
 LOGGED BY: **T. Potter**

EASTING (ft):  
 LONGITUDE:  
 TOC ELEV (ft):  
 BOREHOLE DEPTH (ft): **16.0**  
 WELL DEPTH (ft): **16.0**  
 BOREHOLE DIAMETER (in): **8**  
 CHECKED BY: **T.P.**


Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
5			SAND ; olive brown; fine-grained; moist to wet; no odor; subangular; poorly graded; (0,100,0)						5	
10			Black; slight odor						10	
15									15	
			Hole terminated at 16 feet.							

PROJECT: <b>ConocoPhillips Bulk Plant #140</b> LOCATION: <b>255 Highway 101, South, Crescent City, California</b> PROJECT NUMBER: <b>77CP.60925.03.0010</b>		WELL / PROBEHOLE / BOREHOLE NO: <div style="text-align: center; font-size: 1.5em; font-weight: bold;">OZ-6</div> PAGE 1 OF 1		 <b>SECOR</b>
DRILLING: STARTED <b>11/22/05</b> COMPLETED: <b>11/22/05</b> INSTALLATION: STARTED <b>11/22/05</b> COMPLETED: <b>11/22/05</b> DRILLING COMPANY: <b>Cascade</b> DRILLING EQUIPMENT: <b>Limited Access Rig</b> DRILLING METHOD: <b>Hollow Stem Auger</b> SAMPLING EQUIPMENT: <b>California Split Spoon</b>		NORTHING (ft): LATITUDE: GROUND ELEV (ft): INITIAL DTW (ft): <b>NE</b> STATIC DTW (ft): <b>5 11/22/05</b> WELL CASING DIAMETER (in): <b>3/4</b> LOGGED BY: <b>D. Hovis</b>		EASTING (ft): LONGITUDE: TOC ELEV (ft): BOREHOLE DEPTH (ft): <b>16.0</b> WELL DEPTH (ft): <b>16.0</b> BOREHOLE DIAMETER (in): <b>8</b> CHECKED BY: <b>T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							
5		SP	SAND ; SP; dark brown; fine to medium-grained; soft; saturated; no odor; no staining; moderate cementation; subrounded; poorly graded				10 10 7		5	
10									10	
15			Slight odor						15	
			Hole terminated at 16 feet.							

<b>PROJECT: ConocoPhillips Bulk Plant #140</b> <b>LOCATION: 255 Highway 101, South, Crescent City, California</b> <b>PROJECT NUMBER: 77CP.60925.03.0010</b>		<b>WELL / PROBEHOLE / BOREHOLE NO:</b> <b>OZ-7</b> PAGE 1 OF 1		 <b>SECOR</b>
<b>DRILLING: STARTED 11/1/05 COMPLETED: 11/1/05</b> <b>INSTALLATION: STARTED 11/1/05 COMPLETED: 11/1/05</b> <b>DRILLING COMPANY: Cascade</b> <b>DRILLING EQUIPMENT: Limited Access Rig</b> <b>DRILLING METHOD: Hollow Stem Auger</b> <b>SAMPLING EQUIPMENT: California Split Spoon</b>		<b>NORTHING (ft):</b> <b>LATITUDE:</b> <b>GROUND ELEV (ft):</b> <b>INITIAL DTW (ft): NE</b> <b>STATIC DTW (ft): 5 11/1/05</b> <b>WELL CASING DIAMETER (in): 3/4</b> <b>LOGGED BY: T. Potter</b>		<b>EASTING (ft):</b> <b>LONGITUDE:</b> <b>TOC ELEV (ft):</b> <b>BOREHOLE DEPTH (ft): 16.0</b> <b>WELL DEPTH (ft): 16.0</b> <b>BOREHOLE DIAMETER (in): 8</b> <b>CHECKED BY: T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							Cement
			SAND ; olive brown; fine-grained; moist to wet; no odor; no staining; subangular; poorly graded; (0,100,0)							3/4-inch Sch. 80 PVC Blank Casing
5						1	4 7 6		5	Neat Cement Grout
10			Black; slight odor			1.5	10 26 20		10	Bentonite
15						.5	6 9 13		15	Masonry #3 Sand
			Hole terminated at 16 feet.							Ceramic Diffuser Tip

<b>PROJECT: ConocoPhillips Bulk Plant #140</b> <b>LOCATION: 255 Highway 101, South, Crescent City, California</b> <b>PROJECT NUMBER: 77CP.60925.03.0010</b>		<b>WELL / PROBEHOLE / BOREHOLE NO:</b> <div style="text-align: center; font-size: 1.5em; font-weight: bold;">OZ-8</div> <div style="text-align: right;">PAGE 1 OF 1</div>		 <b>SECOR</b>
<b>DRILLING: STARTED 11/22/05 COMPLETED: 11/22/05</b> <b>INSTALLATION: STARTED 11/22/05 COMPLETED: 11/22/05</b> <b>DRILLING COMPANY: Cascade</b> <b>DRILLING EQUIPMENT: Limited Access Rig</b> <b>DRILLING METHOD: Hollow Stem Auger</b> <b>SAMPLING EQUIPMENT: California Split Spoon</b>		<b>NORTHING (ft):</b> <b>LATITUDE:</b> <b>GROUND ELEV (ft):</b> <b>INITIAL DTW (ft): NE</b> <b>STATIC DTW (ft): 5 11/22/05</b> <b>WELL CASING DIAMETER (in): 3/4</b> <b>LOGGED BY: T. Potter</b>		<b>EASTING (ft):</b> <b>LONGITUDE:</b> <b>TOC ELEV (ft):</b> <b>BOREHOLE DEPTH (ft): 16.0</b> <b>WELL DEPTH (ft): 16.0</b> <b>BOREHOLE DIAMETER (in): 8</b> <b>CHECKED BY: T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							Cement
										3/4-inch Sch. 80 PVC Blank Casing
5			SAND : olive brown; fine-grained; wet; no odor; subangular; poorly graded; (0,100,0)			1	6 15 25		5	Neat Cement Grout
10			Black; saturated			1.25	7 7 9		10	Bentonite
15			Moderate odor			1.5	15 25 13		15	Monterey #3 Sand
			Hole terminated at 16 feet.							Ceramic Diffuser Tip

<b>PROJECT: ConocoPhillips Bulk Plant #140</b> <b>LOCATION: 255 Highway 101, South, Crescent City, California</b> <b>PROJECT NUMBER: 77CP.60925.03.0010</b>		<b>WELL / PROBEHOLE / BOREHOLE NO:</b> <div style="text-align: center; font-size: 1.2em; font-weight: bold;">OZ-9</div> PAGE 1 OF 1		
<b>DRILLING: STARTED 11/22/05 COMPLETED: 11/22/05</b> <b>INSTALLATION: STARTED 11/22/05 COMPLETED: 11/22/05</b> <b>DRILLING COMPANY: Cascade</b> <b>DRILLING EQUIPMENT: Limited Access Rig</b> <b>DRILLING METHOD: Hollow Stem Auger</b> <b>SAMPLING EQUIPMENT: California Split Spoon</b>		<b>NORTHING (ft):</b> <b>LATITUDE:</b> <b>GROUND ELEV (ft):</b> <b>INITIAL DTW (ft): NE</b> <b>STATIC DTW (ft): 5 11/22/05</b> <b>WELL CASING DIAMETER (in): 3/4</b> <b>LOGGED BY: T. Potter</b>		<b>EASTING (ft):</b> <b>LONGITUDE:</b> <b>TOC ELEV (ft):</b> <b>BOREHOLE DEPTH (ft): 16.0</b> <b>WELL DEPTH (ft): 16.0</b> <b>BOREHOLE DIAMETER (in): 8</b> <b>CHECKED BY: T.P.</b>

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Air knifed to 5 feet below ground surface (bgs)							<div style="position: absolute; top: 0; right: 0;">Cement</div> <div style="position: absolute; top: 20%; right: 0;">3/4-inch Sch. 80 PVC Blank Casing</div> <div style="position: absolute; top: 45%; right: 0;">Neat Cement Grout</div> <div style="position: absolute; top: 70%; right: 0;">Bentonite</div> <div style="position: absolute; top: 80%; right: 0;">Monterey #3 Sand</div> <div style="position: absolute; top: 90%; right: 0;">Ceramic Diffuser Tip</div>
5			SAND ; olive brown; fine-grained; moist to wet; no odor; subangular; poorly graded; (0,100,0)						5	
10			Black; slight odor						10	
15									15	
			Hole terminated at 16 feet.							